Combined AHP-TOPSIS-IPA and Statistical Analyses for Implications to One Belt One Road Initiatives

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Abstract

Based on a concerted multilateralism principle of one-belt-one-road (OBOR) initiatives, this study proposes and demonstrates that OBOR initiative should aim to support the PEST (political, economic, social and technology) environments and the competitive-advantage goals of OBOR's participating countries. In doing so, favorable perceptions of the participating countries can be established. Besides, the competitive-advantage goals that OBOR investments can support are generally the ultimate incentives for the participating countries. The data provides the evidential supports. In addition, this study employs AHP, TOPSIS, and IPA (Importance-Performance Analysis) to understand the nature and level of perceived success in ASEAN's one-belt-one-road (OBOR) initiatives. The PEST environments are particularly examined. Overall, the study contributes using a risk management model to link microeconomic to macroeconomic environments, which, leads to the 4C model for OBOR initiatives and implementation. AHP and TOPSIS provide the priority of importance, and importance-performance analysis (IPA) captures the performance gaps to draw implications for the policy makers for OBOR's (one belt one road) participating countries.

Keywords: **O**ne belt one road initiatives; TOPSIS; AHP; IPA analysis; PEST analysis, China; ASEAN

Introduction

The Belt and Road Initiative (BRI), or One Belt One Road (OBOR) Initiative, can be described as "China's grand connectivity project" (Chung, 2017), propelled partly by China's impressive economics performances globally (Zhai, 2017). Due to the global scale, OBOR initiative can be seen to influence towards transforming regional political and economic landscapes (Yang, Jiang, and Ng, 2018). It is the latter issues that warrant the concerns and critiques of the developed countries in particular. If the BRI or OBOR is argued from the structural realist points of view, one can rationalize that China's objective is to use OBOR as means to and end, and ultimately, for its survival and power balancing in the world (cf. Mearsheimer, 2013), and many researchers, thus, argue that the OBOR initiative is a means for China to act within the region (Wang, 2016), which sees the United States towards more defensive reactions (Fint and Zhu, 2019). To defend against the similar variants of defensive arguments, President Xi was quoted saying at the gathering of 37 world leaders:

> "The Belt and Road is not an exclusive club", arguing further that China has rejected accusations that Belt and Road is a "debt trap" and a geopolitical tool for Beijing's ambitions of becoming a global superpower" (Bangkok Post, 2019).

Clearly, different nature of philosophical arguments, such as structural realism (Mearsheimer, 2013), or critical theory (Roach, 2013), or constructivism (Fierke, 2013), could lead to a large variation of interpretations into the intention and objectives of OBOR, both for China and the participating countries. For instance, Flint and Zhu (2019) adopt a political economy approach to geopolitics, highlighting the "single logic" of competition in the capitalist world-economy, that "firms and states are connected as the former seeks to maximize profits while states (i) seek to capture that economic activity within their borders, (ii) make global connections that maximize the benefits of global economic flows for their domestic economy, and (iii) intertwine economic agendas with geopolitical goals" (pp. 95-96). Putting ideologies and theoretical philosophies of international relations aside, it is clear that what matters on the economics will also matter on non-economic issues such as politics, societies and technologies, which is the study of a PEST framework. At a global scale, OBOR would certainly create a new rhetoric of concerns and international relations languages that could lead to new forms of territorial arrangements (Glassman, 2011) and strategic shifts.

In view of the PEST induced challenges, this research attempts only to voice out and point out some of the important concerns of OBOR subject experts and delineates a structural pattern of nation's competitiveness drivers from the available data at global level, so as to bring to the attention of the researchers and relating stakeholders to some practical concerns and structural issues. To some extent, this research underpins on a realist approach, which is presupposed in a philosophical stance that "power is the currency of international politics" (Mearsheimer, 2013, p. 51), in particular it deals with a possible power shifting due to some planned structural changes to the nation's competitiveness systems, as configured in Porter's (1990) Diamond model and studied in Zhao et al, (2019). As argued in Hanafi, Wibisono, Mankusubroto, Siallagan and Badriyah (2017), "In a world of increasing global competition, the nation has become more important as the basis of competition, which is influenced by globalization in responding to global market competition of its superior products and services to fulfil world needs" (p. 335). Nevertheless, to juxtapose the variances of challenges and criticism, Vines (2016) argue for a "concerted unilateralism" approach to Chinese leadership that is more cooperative in manner, such as by means of "creating an international forum, or for a. In such a for a information can be exchanged, preference articulated, discussions can take place, compromises can be reached, and collective action agreed upon. At best, once agreement has been reached within the fora, each individual country will be able to act of his or her own free will, rather than being coerced. This is a form of leadership which helps countries to pursue their own self-interest, i.e. to do what they have already wanted to do, but have been unable to do, acting on their own" (pp. 5-6). Based on cooperative spirit, Liu and Dunford (2016) identify five cooperation priorities in the OBOR Initiative: (1) Policy coordination – co-development of large-scale projects, (2) Facilitative connectivity – infrastructure projects and removal of institutional and logistical bottlenecks, (3) trade facilitation, (4) financial cooperation – to offer good quality financial services, and (5) people-to-people bonds – cultural and academic exchanges (Flint and Zhu, 2019, p. 97). Further on, Huang (2016) stresses on the win-win cooperative position of OBOR initiative,

and through inter-country connectivity, OBOR can be an effective structural stimulation to sustain global economic growth.

Research Objective

One belt one road initiative is an important globalization initiative of China, which provides the logistical and infrastructure connectivity between China and other countries. Due to lack of subjective views of the participating countries, subject experts in one belt one road initiatives are asked for their opinions in PEST domains. To provide meaningful PEST (political, economic, social and technological) analyses of the one belt one road initiatives, mathematical decision-making methods, TOPSIS and AHP are used.

Literature Review

The Belt and Road Summit 2019 in Hong Kong brought a diversity of participants, of them approximately 5000 government officials and business leaders, approximately 520 one-to-one business matching meetings, 80+ prominent international speakers, 100 exhibitors, 100 Mainland China and overseas delegation, and 230+ investment projects (Belt and Road Summit Hong Kong). The testimonials from both the public and private sectors attendants indicate the role of the induced benefits OBOR (One Belt One Road) initiatives can bring to the individuals, businesses, and nations. The interests are, to an obvious observable extent, linked to the nature of environment stimulated through OBOR initiatives. Few of the following testimonials from the summit present the argument supporting the roles of environment that is the integrative functions of political functions, economics progresses, societal development and technological investments:

> "Last year we signed a MoU with a new start-up in Hong Kong, Over the year, our company has already developed a business of about a few million US Dollars, so I think the Belt and Road Summit is a very fruitful event. We always recommend our partners in Thailand to join the Summit" – A senior vice president, Loxley Public Company (Thailand)."

What sums up above is the PEST macroeconomic environment, but the ultimate function this environment serves is to stimulate the development of the markets and the industries in the countries which they have a stake or interest in the OBOR initiatives. Nevertheless, fears must be overcome, and views that block the active participations of the participating countries must not be ignored and should be creatively, theoretically and holistically challenged and resolved. Risk management, so far, has been neglected in the OBOR literature. To lay a groundwork, this research acknowledges that risk management has to be pragmatic, which means it has to consider the business environment that is consisted of both the macroenvironment (such as represented by the "PEST" (Political, Economic, Societal, and Technological) model) and industry's competitiveness. Oliva (2016) argues that the macroeconomic, which includes the environmental forces, such as the PEST forces, should be considered holistically as it can significantly influence the destination of businesses. On similar stance, Zhao, Tan and Jiang (2018) advocate that, to succeed in the implementation of OBOR initiatives, it is important connectivity-related objectives, whether it is people connectivity, governmental connectivity, or/and economy connectivity, should consider the industry's competitiveness of the participating countries, because ultimately, each nation intends to bring about some scopes and levels of industry competitiveness, in order to serve as the stimulus for other domains of development in sustainable manner. The risk model that interlinks the micro- business model level and the PEST macroeconomic

environment level is shown in Fig. 1. In a recent OBOR Summit in Beijing, KiniTV interviewed the Prime Minister Dr. Mahathir Mohammad, and he stated:

> "Now that I understand better the intention behind this idea of the Belt and Road Initiative. In the first place is the problems we have with the ECRL and the Bandar Malaysia, is not about Malaysia and China; it is about money; if it is too expensive for us, we have to reduce the cost, even if the project is with any other countries, we would have to adopt the same strategy to reduce the borrowing from other countries. So, it is not linked to the BRI. China and Chinese companies have been investing a lot in Malaysia. I met them just now and I find that they have put in a lot of money into Malaysia, and they seem to be quite happy with it, and we welcome their investments in Malaysia, as much as we welcome all foreign direct investments." (KiniTV, 2019).

Clearly, the interviews with Dr. Mahathir reflects a need to sensitize over the macro- and micro-economic environment of OBOR's participating countries, especially they are involved in large-scale infrastructure projects that concern not simply connectivity between nations, but also relating to the funding, and how the investments can help further stimulate the businesses in the nation.

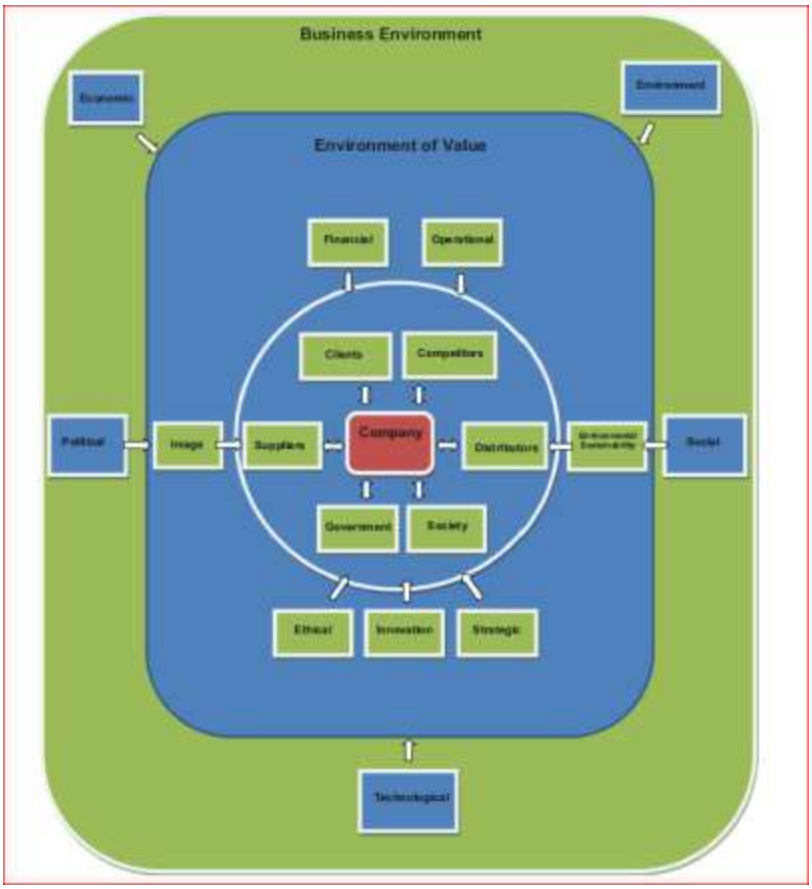


Fig. 1. A Risk Management Model linking Microeconomic to Macroeconomic Environment

For national strategies to systematically and holistically impact on the entire nation's industry and societal developments, Kotler, Kartjahaya and Huan (2014), Kotler, Kartajaya and Setaiwan (2017) advocate that it is important to proactively stimulate changes of the four macroeconomic forces, namely PEST, as shown in Fig. 2. The concept in Fig. 2 is motivated by Zhao, Tan and Jiang (2018). A careful observation of Fig. 2 indicates that the model of 4C (Changes involving PEST, Company, Customer and Competitors) can be further adapted to suit the applications of OBOR initiatives and their implementation. Instead of considering competitors in Kotler et al. (2014; 2017), OBOR model should consider the views, the needs and the actual macro- and micro-economic environmental conditions of the participating countries, along the concept of ecosystems coopetitors, shown in Fig. 2. As such, three important objectives are conceptualized based on the 4C model, namely:

1. Enhance rules and good governance to develop political-security community.
2. Enhance integration and competitiveness of partners and the economy ecosystems.
3. Enhance well-being and livelihood of people.

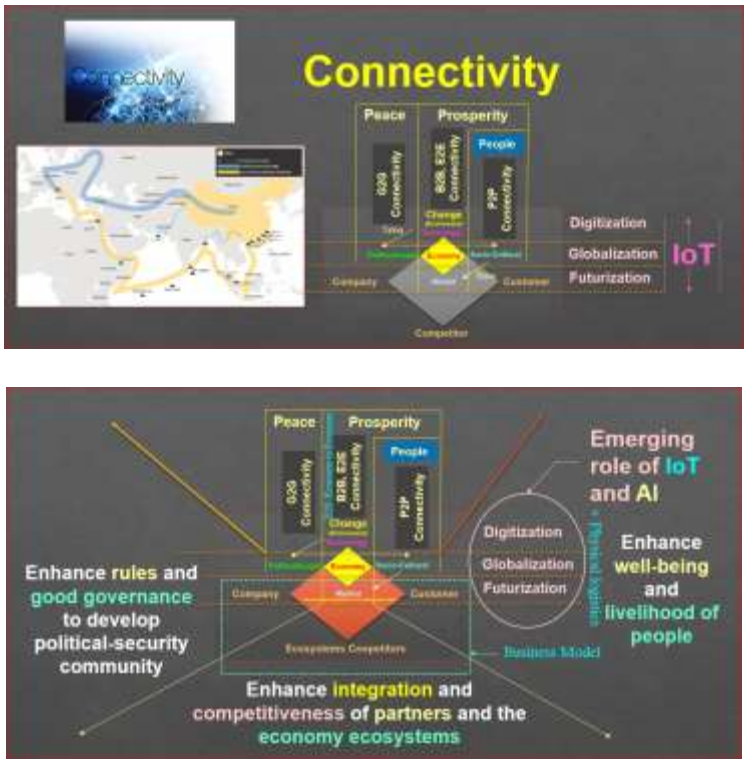


Fig. 2. The Four C Model Suggested for OBOR Initiatives and their Implementations

The first objective highlighted above through the 4Cs is also explained in Brewster (2018), "Although the OBOR initiative is principally economic, Chinese officials acknowledge that it has a political and security component vis-à-vis neighboring states." (p. 69). The second objective reflects the shared inclusivity approach of the Chinese policies through OBORs, as President Xi said:

> "The old mindset of zero-sum game should give way to a new approach of win-win and all-win cooperation. The interests of others must be accommodated while pursuing one's own interests, and common development must be promoted while seeking for one's own development.

> The vision of win-win cooperation not only applies to the economic field, but also the political, security, cultural and many other fields. It not only applies to countries within the region, but also to cooperation with countries from outside the region. We should enhance cooperation of macroeconomic policies to prevent negative spill-over effects that may arise from economic policy changes in individual economies. We should actively promote reform of global economic governance, uphold an open world economy, and jointly respond to risks and challenges in the world economy" (Xi, 2015).

In addition, the advocacy for means to enhance national competitiveness through national cooperation should shift away from a competition perspective (Lundberg, 2010) to cooperative (Cho, Moon and Yin, 2016), PEST connectivity as change targets for a nation (Kotler et al., 2014; 2017) and business ecosystems through OBOR connectivity (Zhao, Tan and Jiang, 2018), shown in Fig. 3. By focusing on such advocacy rather than being reactive, a nation recognizes the latent and manifest politics of approaches to intervention (Wilkins, 2014) can work towards creating the potential value of social change.

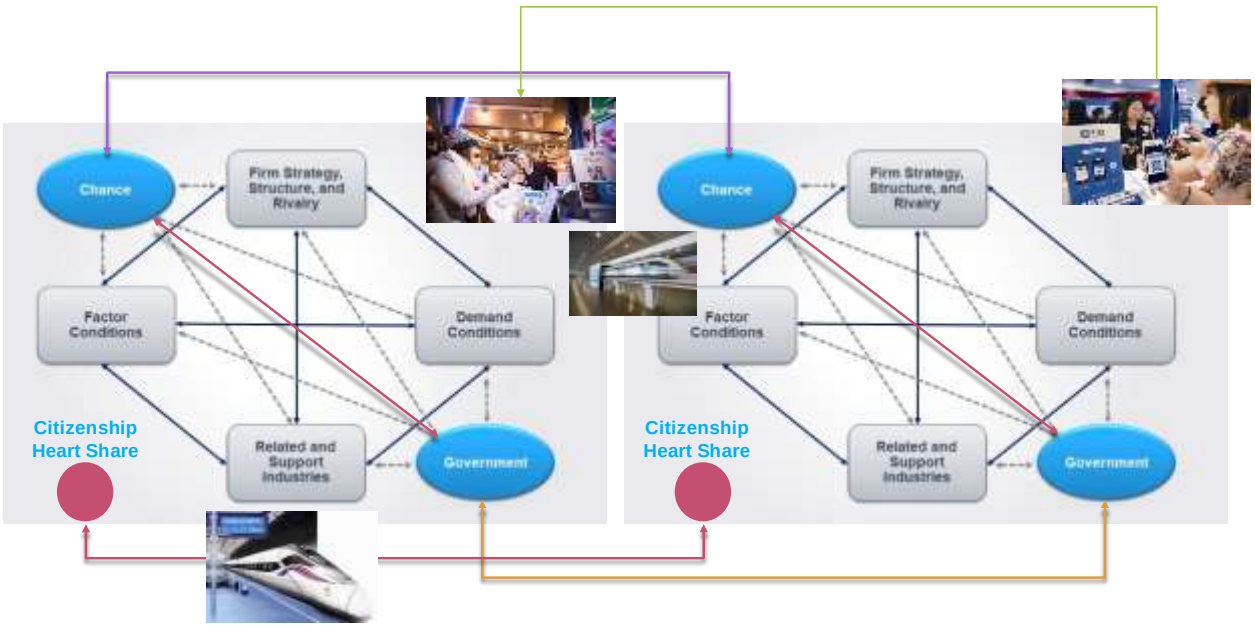


Fig. 3. The Connectivity to Enable Industry's Competitiveness of Participating Countries

The interrelationship structure of PEST is subtle and beyond the scopes of this research, and could involve various deep-rooted theoretical and historical developments (Tan, 2018). For instance, in view of the dominant influence of various different political economic ideologies as methods for promoting development, the United States employed an agenda of modernization through free trade, with a laissez-faire, democratic leadership, whereas, the Soviet Union favored modernization through a planned and centralized economy, with an authoritarian leadership (Pamment, 2014). Fig. 3 is meant for pushing forward on OBOR-enabled and connectivity that benefits a nation's economy, which avoids discussing the international relations theories such as the possibility of seeing a new form of a structural realist in national policy being formed, which may also consider its tactical variants such as defensive realists (i.e. it is unwise for states to try to maximize their share of world power, because the system will punish them if they attempt to gain too much power) or offensive

realist approach that maintains that "it makes good strategic sense for states to gain as much power as possible, and, if the circumstances are right, to pursue hegemony. The argument is not that conquest or domination is good in itself, but instead that having overwhelming power is the best way to ensure one's own survival" (Mearsheimer, 2013, p. 52).

In note passing, if international relations theories are to be discussed, Fig. 3 could be presented and discussed from the view of classical realists (that power is an end in itself), or from the view of structural realists in that power is a means to an end and the ultimate end is survival (ibid, p. 52). Alternatively, through a proactive 4Cs stimulation, it is possible to succeed, OBOR countries, including the concept originating country China, can undertake on a "Social Construction" theory of international relations. From this theoretical lens, once constructed (such as through an ideology or philosophy supporting OBOR, or norms, rules and language used), then, according to Fierke (2013), each of the constructed objects "has a particular meaning and use within a context. They are social constructs insofar as their shape and form is imbued with social values, norms, and assumptions rather than being the product of purely individual thought or meaning" (p. 163). In short, through a constructed "world of our making" (Onuf, 1989), a new rationality and reality is formed.

Method

This research adapts three methods – namely, SPSS (hierarchical multiple regression analysis), TOPSIS (with AHP in the weightage evaluations) and IPA (Importance-Performance Analysis) – to study the current and expected PEST conditions for implications to OBOR (One Belt One Road) initiatives. The skillful uses of TOPSIS-AHP-Neural Network and Structural equation modeling (SEM) based analyses are given in Tan and Julian (2022), Tan et al. (2022), and Tan (2020). The multiple regression is used to analyze the world data by use of existing world competitiveness index in areas of logistics performance index (LPI 2018), T&TCI 2017 (Travel & Tourism Competitiveness Index, 2017), GII 2018 (Global Innovation Index, Dutta, Lanvin, and Wunsch-Vincent, 2019; and corruptions perceptions index (CPI, 2018), which justifies the macro-competitiveness decisions of OBOR initiatives. The TOPSIS and IPA use the data based on OBOR's subject experts to study the current and expected PEST conditions for implications to OBOR initiatives in ASEAN countries.

TOPSIS

TOPSIS is a multicriteria decision-making technique (Tan, 2020). TOPSIS stands for Technique for Order Preference by Similarity to Ideal Solution, which was first introduced by Hwang and Yoon (1981), but soon became a classic multiple attribute decision making (MADM) method with more than 4,500 citations (Yoon and Kim, 2017). TOPSIS has been used in various strategic and operations management studies. For instance, Subramaniya, Guru Dev and SenthilKumar (2017) uses TOPSIS to identify the critical success factors (CSFs) which could contribute to increase the agility level of the Textile industry in India. Ajmera (2017) uses TOPSIS to rank the strategies for Indian medical tourism sector through the integration of SWOT analysis and TOPSIS method. That is, based on SWOT analysis, organizations can then use TOPSIS to find the best alternative among the available strategic alternatives that is important for firm to sustain in today's competitive marketplace (Ajmera, 2017). By treating the numbers of the respondents as describer of compatibility to fuzzy concept (Zadeh, 2009), TOPSIS can be turned into a fuzzy TOPSIS version (Shakerian, Dehnavi, and Ghanad, 2016).

TOPSIS assumes that if we have m alternatives (options) and n attributes / criteria and we have the score of each option with respect to each criterion:

Let x_{ij} score of option i with respect to criterion j; a matrix A = (x_{ij}) of mXn matrix; Let J be the set of benefit attributes or criteria, and let J' be the set of negative attributes or criteria.

Step 1: Construct normalized decision matrix – this step transforms various attribute dimensions into non-dimensional attributes, which allows comparisons across criteria, and normalize scores or data as follows:

$$r_{ij} = \frac{x_{ij}}{\sum x_{ij}^2} \text{ for } i = 1, \ldots, m; j = 1, \ldots, n.$$

Step 2: Construct the weighted normalized decision matrix, by assuming we have a set of weights for each criteria w_j for j = 1,…, n. Then, we multiple each column of the normalized decision matrix by its associated weight, and thus the element become:

$$v_{ij} = w_j r_{ij}$$

Step 3: Determine the ideal and negative ideal solutions:
Positive Ideal solution:
$A^+ = \{v_1^+, \ldots, v_n^+\}$
Where:
$v_j^+ = \{\max(v_{ij}) if\ j\ \in J; \min(v_{ij}) if\ j\ \ni J'\}$

Negative Ideal solution:
$A^- = \{v_1^-, \ldots, v_n^-\}$
Where:
$v_j^- = \{\min(v_{ij}) if\ j\ \in J; \max(v_{ij}) if\ j\ \ni J'\}$

Step 4: Calculate the separation measures for each alternative
The separation from the positive ideal alternative is:

$$S_i^+ = [\sum(v_j^+ - v_{ij})^2]^{1/2}\ ;\ i = 1, \ldots, m$$

Similarly, the separation from the negative ideal alternative is:

$$S_i^- = [\sum(v_j^- - v_{ij})^2]^{1/2}\ ;\ i = 1, \ldots, m$$

Step 5: Calculate the relative closeness of alternative to the ideal solution P_i^*, which is a value function (Yoon and Kim, 2017)

$$C_i^* = \frac{S_i^-}{S_i^+}, 0 < C_i^* < 1$$

Choose the alternative in which C_i^* is closer to 1, or perform the ranking from among the alternatives, so that prioritization of the strategies can be identified, or benchmarking of the best performed from the alternatives can be revealed.

It is noted in Yoon and Kim (2017) that the value function can be rewritten by $S_i^- = VS_i^+$, which is a straight line that has a slope of V and V-axis intercept of zero where the value increased, the line becomes steeper. Then, as shown in Yoon and Kim (2017), the most preferred alternative is one that meets the indifference curve with the steepest slope. Fig. 4 shows A_1 is the most preferred alternative and A_3 is the least preferred.

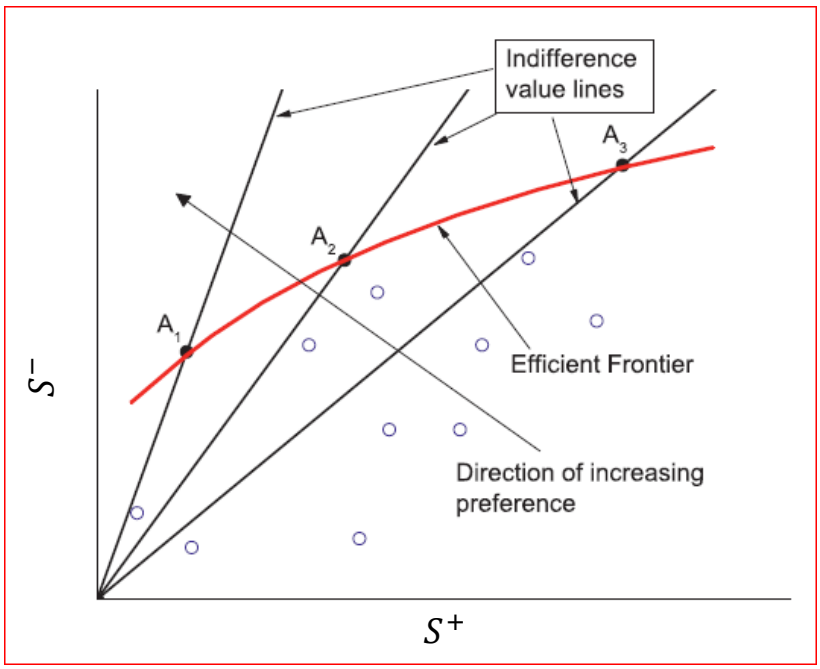


Fig. 4. Preference Order by Original TOPSIS

Correspondingly, A_j is preferred to A_k if the slope, V of A_j is more than V of A_k:

$$\frac{S_j^-}{S_j^+} > \frac{S_k^-}{S_k^+}$$

Which is mathematically equivalent to the following equation,

$$\frac{S_j^-}{S_j^+ + S_j^-} > \frac{S_k^-}{S_k^+ + S_k^-}$$

That is, the relative closeness of alternative A_i to the ideal solution is defined as:

$C_i^+ = \frac{S_i^-}{S_i^- + S_i^+}; i = 1, \dots, n;$ where $0 \le C_i^+ \le 1$, and $C_i^+ = 0$ when $A_i = A^-$, and $C_i^+ = 1$ when $A_i = A^+$. TOPSIS picks an alternative that has the maximum C^+, or rank them accordingly.

Importance-Performance Analysis

Since the original seminal conception owed to Martilla and James (1977), IPA (Importance-Performance Analysis) technique has gained widespread usages and popularity in the field of strategic management discipline as well as hospitality and tourism industry (Azzopardi and Nash, 2013; Matzler, Sauerwein and Heischmidt, 2003), partly owed to its simplicity to quickly point out the areas of significance and actual performances. Two important questions are raised in a typical IPA, namely (1) "How important is a certain construct or variable important to the decision maker?" and (2) "How satisfied performance has been achieved in relation to the construct or variable of concern?". Thus, IPA is a broad-based approach to help researchers, practitioners and policy makers identify constructs or variables to target, and the resources and investments needed for performance realization.

Specifically, IPA provides a mapping scenario to illuminate where and what efforts are to continue, such as by addressing resource allocation and policy decision making. Too much exertion on low-important areas would identify areas of potential overkill, and thus the decision makers could re-allocate resources for alternative purposes that can better bring values to the decision makers. In short, IPA technique is a "basic diagnostic decision tool that facilitates the identification of improvement prioritization, the mobilization and deployment of scarce resources to where they are needed most, and the harmonization of strategic planning efforts to enhance relative competitiveness" (Azzorpadi and Nash, 2013, p. 223).

Results and Discussion

Vines (2016) suggests a concept of concerted unilateralism and international leadership that China could pursue in macroeconomic policymaking in a multipolar world. By "concerted", Vines (2016) explains that it involves nations and their leaders are brought together through common shared synergies and thus "are prepared to do the necessary work, and if necessary, invest the necessary resources, and to bring about the necessary agreement, of a kind which enables self-interested action to take place in a mutually supportive manner" (p. 7). Underpinned on the similar logic and based on shared prosperity, peace and connectivity mission, as advocated in OBOR initiative principle, it is necessary for China to proactively sense and incorporate the opportunities abroad. Towards this end, we suggest PEST framework as a valid and useful mechanism that could provide some fundamental bases of monitoring to guide China in adjusting strategies to improve OBOR initiative implementation. Particularly, rather than focusing on PEST monitoring and decision-making reactively, the literature review section has articulated and suggested that the PEST can be approached with change-oriented mindset, driven by integrating the four domains of PEST through strategic conceptions. Thus, PEST framework is a valid and useful mechanism as it considers the fundamental macro-level context for laying out the groundworks for competitiveness-oriented approach.

The PEST framework fits the three mixtures of goals and strategies of the Belt Road Initiatives (BRIs): 1) Economic integration, 2) Regional influence (i.e., social and technological), and 3) global geopolitical competition (Flint and Zhu, 2018). As it is argued in Zhao, Tan and Jiang (2018), and Vines (2016), when the economic development plan of OBOR can consider and integrate the other nation's competitiveness requirements and potentials, it can project favorable cooperative spirit (Cho, Moon, and Yin, 2016), the geopolitical goals and implications can be effectively met (Glassman, 2011) and can also better re-shape the political, economic, societal and technological competitiveness at international level (Huang, 2015). Cross national cooperation and integration, as many

researchers have presented in the context of OBOR, involves a need to "create a multitier inter-governmental mechanism for macro-policy dialogues, deepen shared interests, reach new consensus and promote political trust", and through infrastructure connectivity, unimpeded trade, financial support, and people-to-people exchange (Huang, 2016). The data presented in this section, and discussed in the following, provides an exploratory attempt to lay out the groundworks on PEST-induced OBOR's strategy adjustments.

In the PEST context, goal of infrastructure connectivity is probably the most prominent as its functions pervade the influences across the entire PEST domains. Given the low level of infrastructure development in most BRI countries (Zhai, 2018, p.2), as also indicated in Fig. 5, BRI can serve to help the OBOR-participating countries remove infrastructure bottlenecks, and in doing so, it can foster further regional economic integration and development.

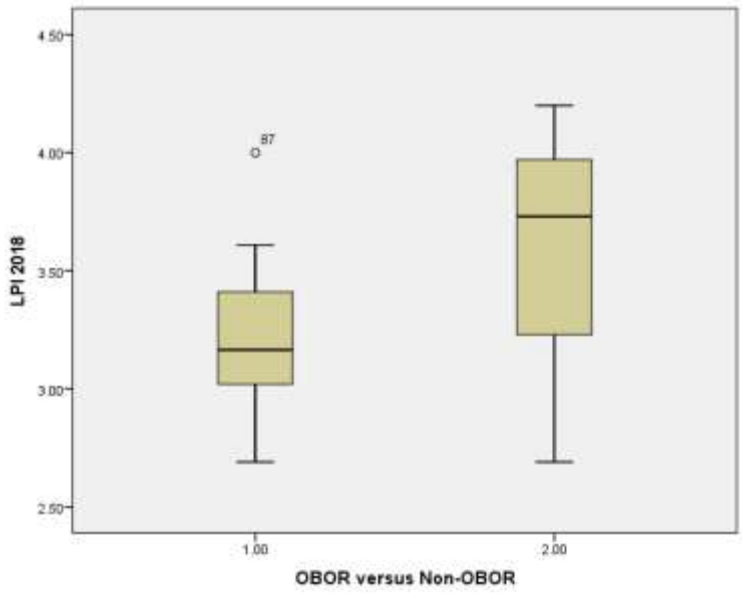


Fig. 5. Logistics Performance Index 2018 in Comparison between the OBOR [1] and Non-OBOR Participating Countries [2] (Source: Zhao, Tan and Jiang, 2019)

To study the nature of competitiveness capable to explain the national logistics performance index 2018, we collected globally monitored indexes such as LPI (Logistics Performance Index), T&TC (Tourism & Travel Competitiveness), CPI (Corruptions Perceptions Index), and GII (Global Innovation Index). A careful observation of the innovation input sub-index in the GII 2018 report reveals that its component-wise structure shares the concept advocated in Porter's Diamond Model (1990). Porter's Diamond model is generally acknowledged as a useful framework to help a nation building its competitive advantages. The framework is long-term (10 years or more) in basis, and is suitable for public policy development and national attractiveness, and point towards the areas to help firms in a nation build competitiveness and innovativeness (Solvell, 2015). As argued in Cho, Moon and Yin (2016), "Unlike the resource-based view of a firm, the diamond model deals with not only the firm activities but also other factors related to industries and rivals… In addition, Porter's new theory on competitiveness has an advantage of being comprehensive by capturing the most important variables or concepts stressed by related existing theories" (p. 484).

There are significant differences across the different regions of OBOR-participating countries listed below, shown in Figs. 6-8:

- South Asia – Pakistan, Bagladesh, Sri Lanka, Afghan, Nepal, Maldives, Bhutan
- Southeast Asia – Indonesia, Thailand, Malaysia, Vietnam, Singapore, Philippines, Myanmar, Cambodia, Laos, Brunei, East Timor.
- West Asia and North Africa – Saudi Arabia, UAE, Oman, Iran, Turkey, Israel, Egypt, Kuwait, Iraq, Katar, Jordan, Lebanon, Bahrain, Yemen, Syria, and Palestine.
- Central Asia countries – Kazakhsta, Uzbekistan, Turmenistan, Kyrghyzstan, and Tajikista.

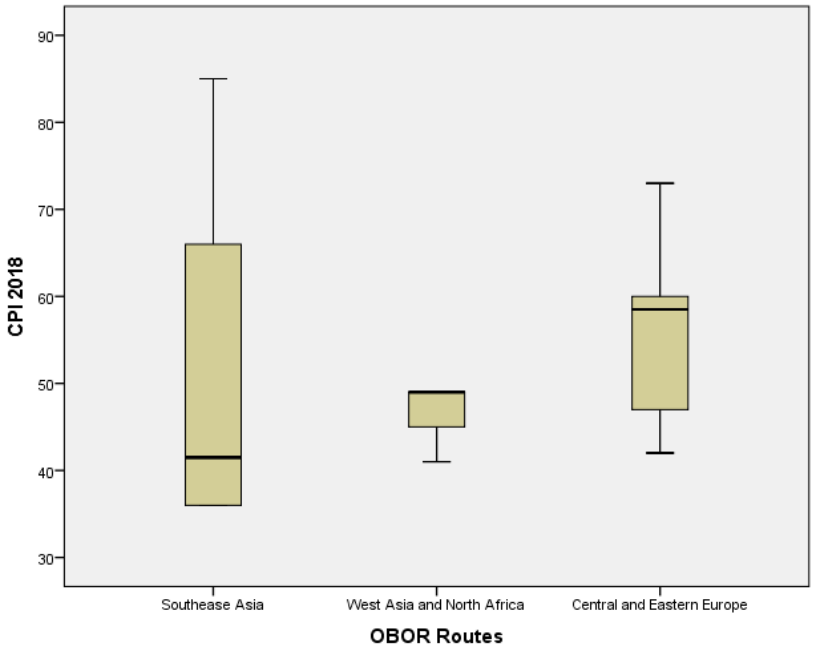


Fig. 6. CPI 2018 Comparisons

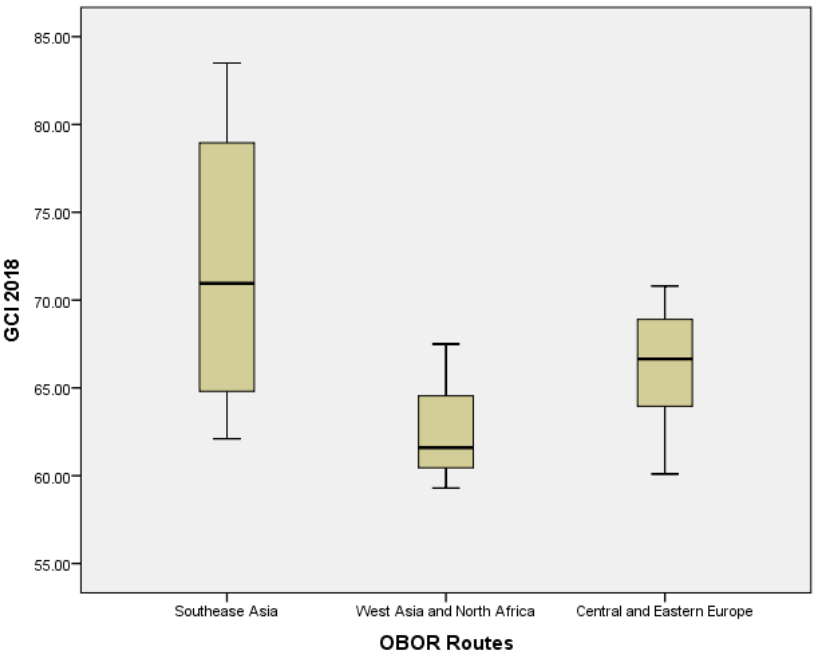


Fig. 7. GCI 2018

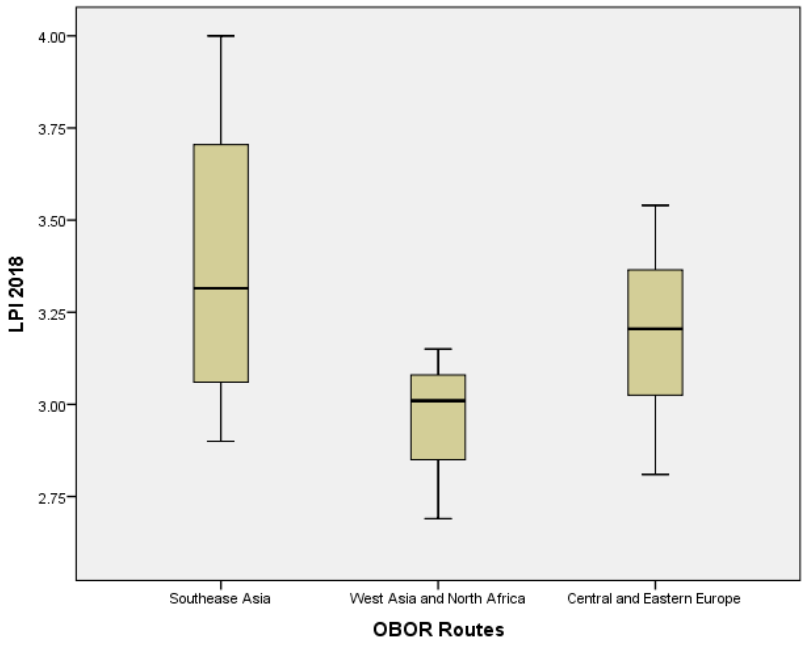


Fig. 8. LPI 2018 Comparisons

In view of the above data analysis results, we conclude that:

> "OBOR-initiative design and executions should need to sensitize and actively help strengthen the competitiveness drivers of OBOR-participating nations, and in particular, three aspects are to be stressed: (1) travel and tourism competitiveness, (2) global innovation competitiveness, and (3) the governance strength of the public administration.

Technological investments especially on infrastructure are the dominant ones prioritized by the China government, which includes the "building of railway and highway networks, port facilities, pipelines, airports and energy and communication infrastructure" (Zhao, 2018), and also requires "massive funding and long-term commitments, and often entails political risks and diplomatic sensitivities" (ibid, p. 2). Nevertheless, a TOPSIS analysis of the perceptions of the OBOR experts associated with the Institute of Southeast Asian Studies, Yunnan Academy of Social Sciences, shows three perceptual differences which may be of potential implications, as being reflected in Fig. 9. The ultimate purpose of Fig. 9 is to help researchers and policy makers identity the gaps between the importance and actual perceptions that reflect the reality. A TOPSIS ranking by technological factors show three distinctive perceptual groups of experts: The "A" zone shows gaps of political, economic, societal factors (PES), in different performance direction, whereas expert group "B" shares positively correlated synergies among the PEST factors, and group "C" is an expert group involves a mixture of opinions but are non-technological favor in nature.

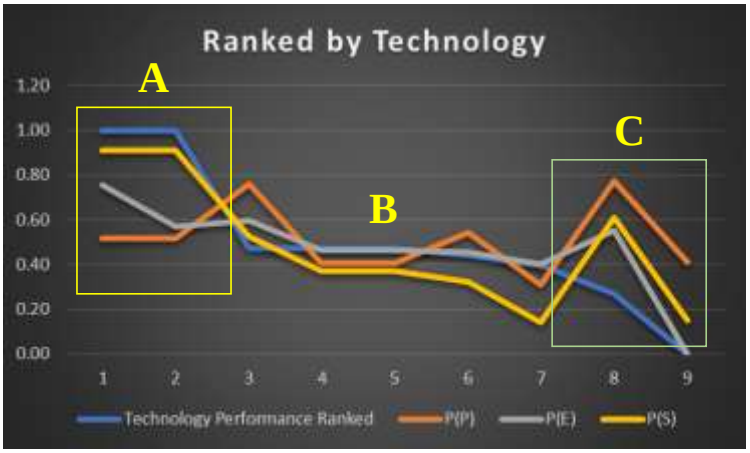


Fig. 9. TOPSIS-yielded PEST Analysis, Ranked by Technology

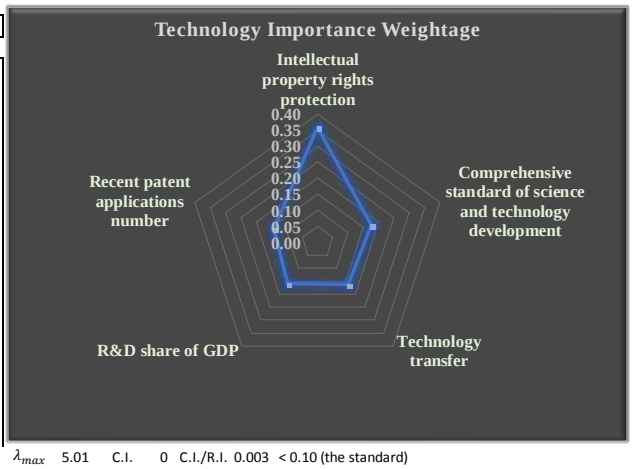
Through TOPSIS, this research attempts to provide the visibility at an important level that can prompt for strategic and operational thinking and efforts.

It is aimed that through this research, with the use of TOPSIS and AHP methods, it can provide some useful insights to help the strategists and policy makers of OBOR participating countries, including Chain, to see the various interrelated perspectives and concerns.

Based on the AHP method, the importance weightages assigned collectively by the OBOR subject experts are: 36% to intellectual property rights protection, 18% to the comprehensive standard of science and technology development, 16% to both technology transfer and R&D share of GDP, and 14% to the recent patent applications number, in ASEAN regions. The collective AHP calculations and importance weightage plots are given in Fig. 10.

Collective

	P1	P2	P3	P4	P5		
P1	1.00	0.48	0.81	0.83	0.78		
P2	2.08	1.00	2.22	2.39	2.33		
P3	1.23	0.45	1.00	1.17	1.11		
P4	1.20	0.42	0.86	1.00	1.00		
P5	1.29	0.43	0.90	1.00	1.00		
SUM	6.79	2.78	5.79	6.39	6.22	Criteria Weight	
P1	0.15	0.17	0.14	0.13	0.13	0.143	P1
P2	0.31	0.36	0.38	0.37	0.38	0.360	P2
P3	0.18	0.16	0.17	0.18	0.18	0.175	P3
P4	0.18	0.15	0.15	0.16	0.16	0.159	P4
P5	0.19	0.15	0.16	0.16	0.16	0.163	P5
SUM	1.00	1.00	1.00	1.00	1.00	1.000	
CONSISTENCY						Weighted Sum Value	
P1	0.14	0.17	0.14	0.13	0.13	0.718	5.01
P2	0.30	0.36	0.39	0.38	0.38	1.806	5.02
P3	0.18	0.16	0.18	0.18	0.18	0.879	5.02
P4	0.17	0.15	0.15	0.16	0.16	0.795	5.01
P5	0.18	0.15	0.16	0.16	0.16	0.818	5.01

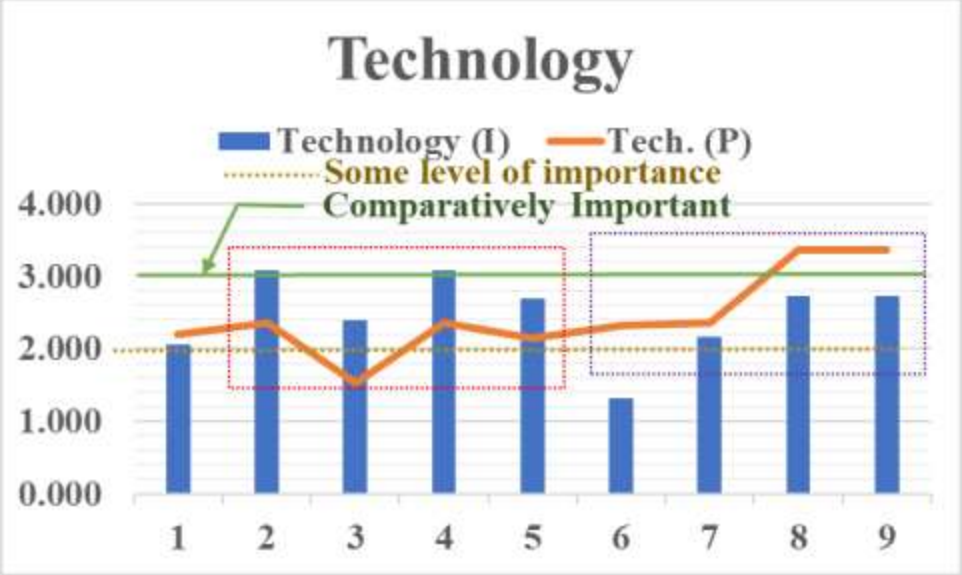


λ_{max} 5.01 C.I. 0 C.I./R.I. 0.003 < 0.10 (the standard)

Fig. 10. Technological Importance Weightage Obtained from AHP Method (Source: This research)

Majority of the OBOR subject experts have the perceptions of importance fall on the level between 2-3 (somewhat important to comparatively important), with level 4 at very important level. The perceived actual performance level is shown relative to the perceived

importance level for the 9 subject experts in OBOR, which shows that majority of the perceived performance in between 2-3 levels (namely, there is some degree of influence to OBOR and meeting the satisfaction, respectively). Nevertheless, there are obvious two variances among the subject experts, with one group having actual perceived performance at below the important level while the other is opposite in nature.



Fig, 11. Expert Perceptions on IPA

Importance-Performance Analysis (IPA) was first developed by Martilla and James in 1977. Since then, according to Sulaiman, Jahwari, Sirakaya-Turk and Altintas (2016), IPA method has been widely used in different disciplines due to its simplicity and efficacy in showing the position of assorted attributes in a visually appealing format. In this research, we resolve to only the Radar Chart for the visual expression to facilitate the explanation. Shown in Fig. 12 is the Radar Chart plot for the IPA of politics (OBOR), which indicates four wider gaps needed to be addressed in helping to move OBOR initiatives forward in favorable manner, namely: (1) P1 = the political stability (政局稳定性), (2) P2 = issues with nationalism (民族主义问题), (3) the separatism issue of people in a nation (民族分离主义问题), and (4) P7 = the policy stability of the nation (政策稳定性).

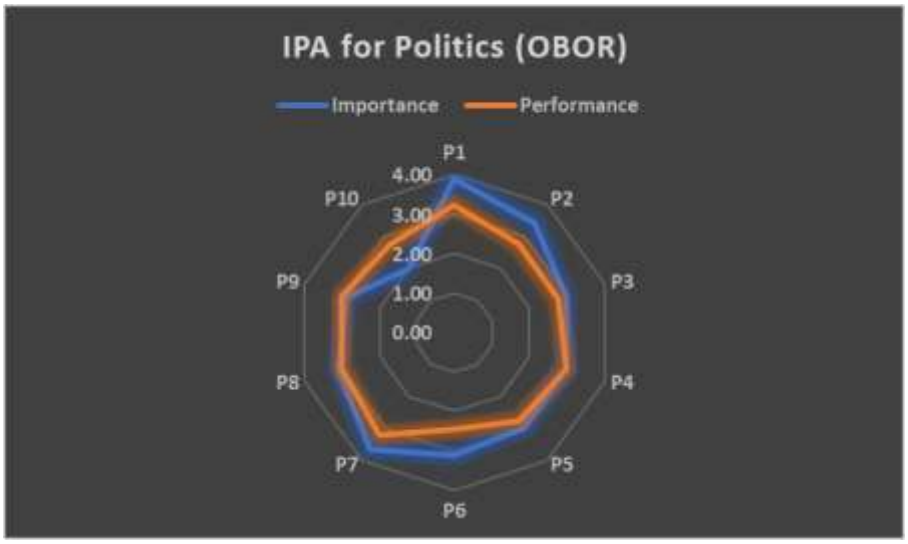


Fig. 12. IPA for Politics (OBOR)

In view of the social domain, two wider gaps that are consider capable to influence OBOR progresses in favorable manner are P1 (demographic ration, 人口结构比) and P8 (the people's sensitivity to product quality, 国家民众对商品质量的敏感度).

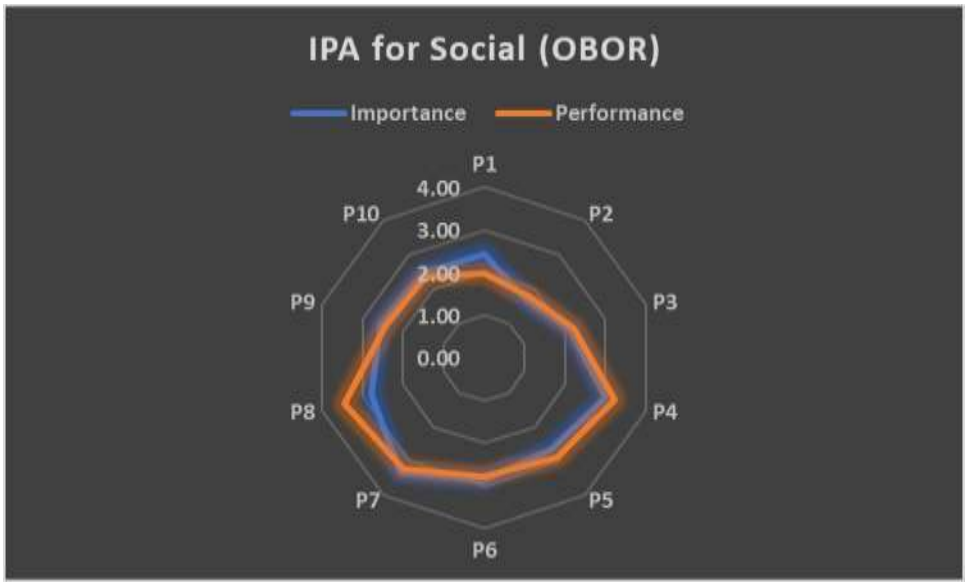


Fig. 13. IPA for Social (OBOR)

Lastly in the domain of technology, the wider gap exists for P2, which is patent protection law (专利保护法).

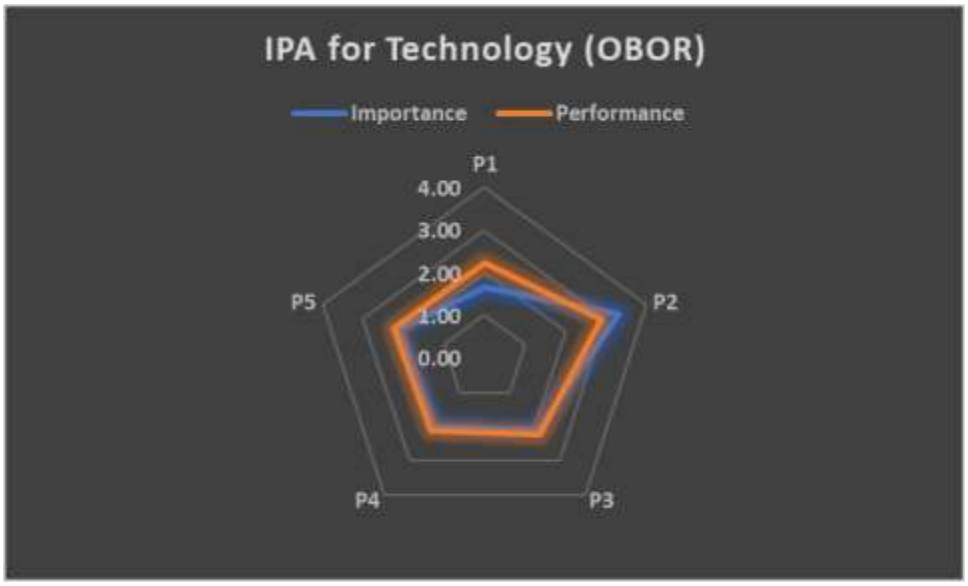


Fig. 14. IPA for Technology (OBOR)

Quoted in Han and Guo (2019), "A comprehensive IP protection system has come into shape in China since the 40 years' of reform and opening up, making outstanding achievements to the great undertakings," said Director General of the World Intellectual Property Organization (WIPO), Mr. Francis Gurry, who attended 2018 High-Level Conference on IP for Countries along the Belt and Road and the 9th China Patent Annual Conference recently. Since then, China's innovation achievement has been very impressive, being ranked 17 in the world for Global Innovation Index 2018, which is above Canada (Ranked 18), Australia (Ranked 20), and Thailand (Ranked 38). Thus, as shown in Fig. 15 in the GII 2018 report, China is currently an innovation leader in the world.

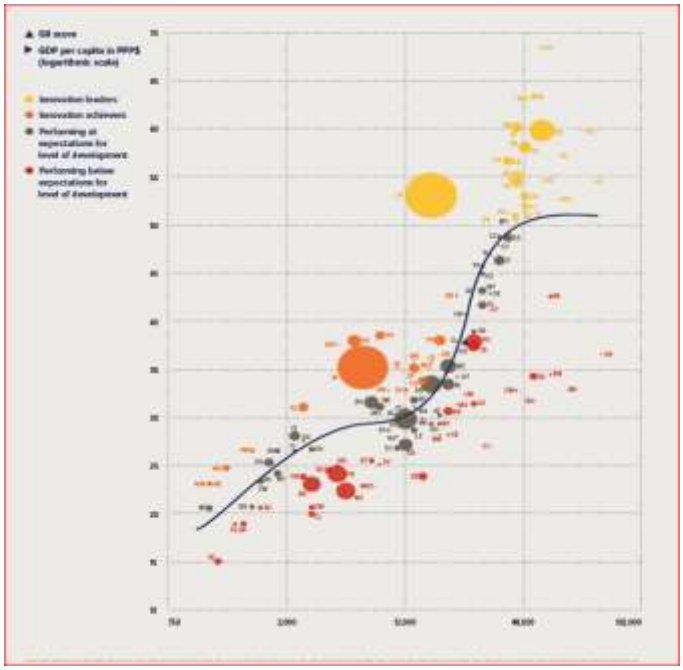


Fig. 15. GII Scores and GDP Per Capital in PPP$ (Bubbles Sized by Population) (Source: Dutta et al. 2019, p. xxxvi)

The OBOR subject experts' perceptions and worries about the gaps on patent protection is reflected in another way through GII 2018, which sees a comparatively significant difference between OBOR and non-OBOR countries. Lerner (2002) reported a significant positive impact of the patent system on innovation by examining shifts in the strength of patent protection across sixty countries and a 150-year period. The concern of the OBOR subject experts has many empirical supports, for instance, in Hall and Helmers (2010), they show that the stronger patent protection encourages FDI and technology transfer to mid-level developing countries.

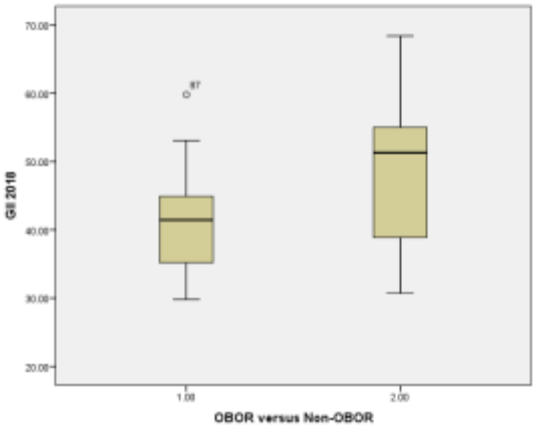


Fig. 16. GII 2018 Scores between OBOR Countries and Non-OBOR Countries (Zhao, Tan and Jiang, 2019)

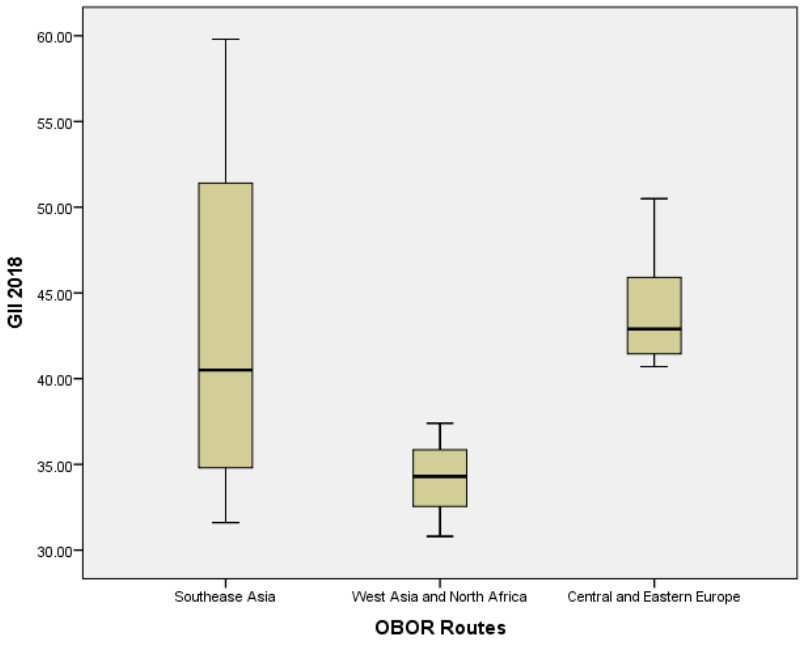


Fig. 17. GII 2018 Scores for the Different OBOR Route-Regions (Source: Zhao, Tan and Jiang, 2019)

As to the economics domain, two wider gaps exist in P4 (stability of macroeconomics, 宏观经济形势的稳定性) and P10 (import and export factors, 进出口因素). As Helpman and Grossman (1989) pointed out, "not only technology affects trade, but also

trade affects the evolution of technology". The OBOR initiatives have seen an accelerated exports of China's infrastructural technologies to OBOR countries, but many are in the forms of fund-lending (i.e. some $8 trillion lending for infrastructure development in 68 countries), which is part of the importing and exporting determinants that can serve as a risk of financing from the borrowing countries.

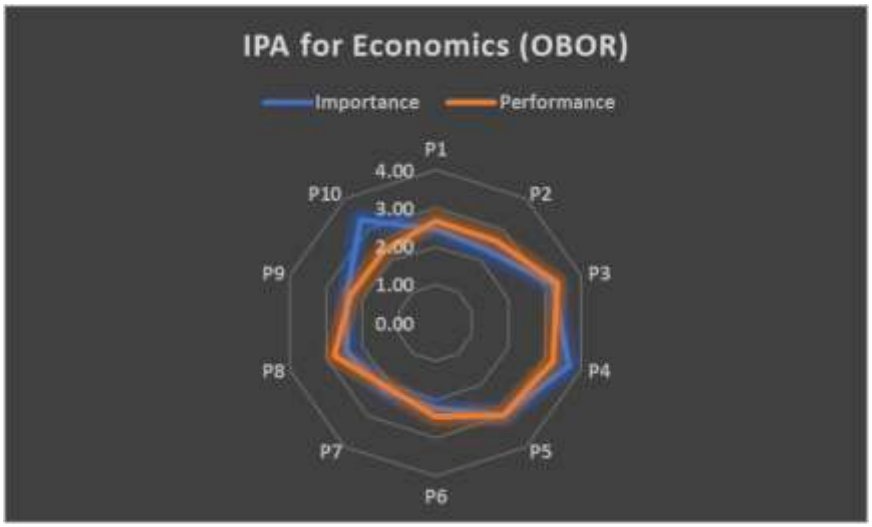


Fig. 18. IPA for Economics (OBOR)

Conclusion

This study draws the attention of the policy-makers of one-belt one-road (OBOR) initiatives towards a need to consider both macro-environments, noted as PEST environments of the participating countries, and the competitive-advantage goals of them. Competitive advantage is an ultimate, pragmatic goal of any nation, and a proactive consideration in this aspect provides a strong base for implementing concerted multilateralism principles of China in OBOR.

Specifically, using TOPSIS (Tan, 2020), this study provides the comparative visibility of where PEST performance domains best perform in China's one-belt one-road (OBOR) initiatives in ASEAN countries. The study also concludes that one-belt one-road initiatives can assist OBOR countries to improve their global innovation competitiveness, but first, they need to help improve stability of macroeconomics and imports and exports of OBOR countries. Beside considering the role of logistical infrastructure for nation-to-nation connectivity, this study also demonstrates that OBOR can benefit to improve the competitive advantages of the participating nations.

In addition, TOPSIS, AHP, and IPA analyses highlight numerous concerns of performance gaps as perceived from the OBOR subject experts in China. It is assumed, as inferred from this research, that addressing these performance gaps would benefit both China and the participating countries of OBOR.

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